



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/792,323

03/03/2004

Lawrence C. Lei

AMAT/5191C1/ISM/CORE/MCVD

4370

44257

7590

03/19/2007

PATTERSON & SHERIDAN, LLP

3040 POST OAK BOULEVARD, SUITE 1500

HOUSTON, TX 77056

EXAMINER

PAIK, SANG YEOP

ART UNIT

PAPER NUMBER

3742

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

03/19/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/792,323

Applicant(s)

LEI, LAWRENCE C.

Examiner

Sang Y. Paik

Art Unit

3742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 22-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 22, 23, 24, 25, 26, 30, 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Onoe et al (US 6,270,839).

Onoe shows the apparatus for vaporizing a solid precursor claimed including a housing with at least two surfaces such as the stainless steel mesh or wires with a solid precursor applied thereto, and a heating member in thermal communication with the two surfaces and the housing (also see Figure 1). It is also shown that the at least two surfaces are spaced to allow passage of the carrier gas. Onoe also teaches that the outlet is connected to a growth chamber of a CVD apparatus.

Art Unit: 3742

With respect to the recitation of solid precursors being tantalum or tungsten, it is noted that these recitations relate to the materials or articles worked upon by the apparatus, and they do not limit the apparatus claims. MPEP 2115.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Onoe et al (US 6,270,839) over the admitted prior art or in view Suntola et al (US 4,413,022).

Onoe shows the apparatus except for the deposition chamber is an ALD chamber.

Suntola shows that it is known in the art that that the vaporized precursor is applied for the CVD or ALE (atomic layer Epitaxy) for the film deposition or growth. The applicant also describes in the application's background that such CVD and ALD depositions are well known in the art. Thus, it would have been obvious to one of ordinary skill in the art to adapt Onoe with the ALD deposition chamber or any other known chamber for the desired vaporized film depositions.

5. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onoe et al (US 6,270,839) over Suntola et al (US 4,413,022) or Kim (US 6,424,800).

Onoe shows the apparatus except showing that the heating element is contained in the wall of the housing or in one of the at least two surfaces.

Suntola shows a housing in which the precursor is disposed therein with a heating element (68) provided in the wall of housing to effectively heat the precursor therein, and Suntola also shows that heating element (56) can be provide with the precursor applied or contained surface. Kim also shows that heating element can be applied to the housing (see Figure 2) or within a housing where a heating element is provided with the surface supplied with a solid precursor.

In view of Suntola or Kim, it would have been obvious to one of ordinary skill in the art to adapt Onoe with the heating element in the wall of the housing or in the precursor applied surface as an alternative heating arrangement to provide the heating necessary to vaporize the precursors.

6. Claims 32-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onoe et al (US 6,270,839) or Suntola et al (US 4,389,973) in view of Gartner et al (US 4,947,790), Loan et al (US 6,296,711) or Arnold et al (US 5,224,202).

Onoe or Suntola shows the apparatus claimed including a housing with a carrier gas inlet, an outlet, at least two surfaces containing a solid precursor spaced to allow passage of the carrier gas therebetween, a heating member or source in thermal communication such as in thermal conduction for heating the wall of the housing and the at least two surfaces. But, neither Onoe nor Suntola shows at least two cone shaped surfaces.

Gartner shows a solid precursor applied surface including a cone shaped surface as well as a linear and a U-shaped surface to hold the precursor and to allow the vaporization of the precursor upon heating. Loan and Arnold further show that it is well known in the art that a precursor is applied to a cone shaped surface for the vaporization of such precursors. Loan shows

Art Unit: 3742

that it is also known in the art to provide a heater contained within the cone shaped surface to provide the vaporization heating, and Arnold shows that it is known to provide a heater contained in a wall of the housing. Gartner also teaches that solid precursor containing bed (13) is made of quartz which is a ceramic material.

In view of Gartner, Loan, or Arnold, it would have been obvious to one of ordinary skill in the art to adapt Onoe or Suntola with the various shapes or surfaces including a cone-shaped surface as an alternative surface arrangement to conveniently support and hold a precursor, including a solid precursor, for a more effective vaporization of such precursor materials. Furthermore, it would have been obvious to one of ordinary skill in the art to provide the heating member inside the wall of the housing or the surfaces to effectuate a more effective and direct heating of the applied precursors.

With respect to the recitation of solid precursors being tantalum or tungsten, it is noted that these recitations relate to the materials or articles worked upon by the apparatus, and they do not limit the apparatus claims. MPEP 2115.

#### ***Response to Arguments***

7. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Y. Paik whose telephone number is 571-272-4783. The examiner can normally be reached on M-F (9:00-4:00) First Friday Off.

Art Unit: 3742

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Sang Y Paik  
Primary Examiner  
Art Unit 3742

syp